REMARKS

Claims 1-12 are pending. Claims 2, 4, and 6-10 are original. Claim 1 is previously presented. Claims 3 and 5 are currently amended. Claims 11 and 12 are newly added.

Support for amended claims 3 and 5 can be found in general throughout the application and particularly at least on page 9 lines 8-9 and page 14 lines 10, 25 and 32.

Support for new claim 11 can be found at least on page 17, Table 10, Examples 1-4.

Support for new claim 12 can be found in general throughout the application, and in particular as follows:

With regard to the claim element of "undegraded" PET in steps a) and b) of claim 11, the existence of PET in an undegraded form is supported at least by the discussion on page 2 line 14 of the application as originally filed. With regard to the claim element (in step a)) of feeding undegraded PET into an extruder, this is supported at least by the discussion on page 15 line 16 (Examples 1-17) of the use of 3M PET 651000 resin, in combination with the fact that one of ordinary skill in the art of making and using PET would, from background knowledge available to one of ordinary skill in the art, recognize that 3M PET resin 651000 is an undegraded PET resin, at least at the time of the filing of the instant application. Attached in support of this contention is an excerpt from a technical paper (Lepers et. al., 1999), available before the filing date of applicant's invention, which describes 3M PET resin 651000 (page 942, "Materials") as a (a "general-purpose polyethylene terephthalate" of molecular weight 36,300 g/mol), as well as an excerpt from the Encyclopedia of Polymer Science (1985) entry on PET, which describes the process of making PET resin in such terms as make it clear that an ordinary, general-purpose PET is an undegraded resin (that is, polymerized to a final molecular weight and maintained at that molecular weight thereafter, as opposed to being made to a higher molecular weight and then degraded back to a lower, final molecular weight).

With regard to the claim element (in step b)) of extruding molten undegraded PET polymer through the orifices of the meltblowing die, this is supported at least by the discussion on page 6 lines 18-19 and 24-25 in combination with the discussion on page 15 lines 15-17. That is, applicant's discussion of feeding undegraded PET resin of intrinsic viscosity 0.6 into an extruder (page 15 line 16), and of the PET subsequently being extruded through the orifices of a

melt-blowing die at an intrinsic viscosity of 0.6 (page 6 lines 18-19 and 24-25), would lead one of ordinary skill to appreciate that the PET resin had not become degraded (which would lead to a drop in the intrinsic viscosity) prior to being extruded through the orifices.

With regard to the claim element of the PET resin having an intrinsic viscosity of between about 0.45 and 0.75, this is supported at least by original claim 2 and by the discussion on page 11 lines 7-16.

Reconsideration of the application in view of the remarks below is requested.

Interview Summary

Applicant appreciates the courtesy extended by Examiner Butler during the telephone interview with applicant's representative (Kenneth B. Wood, #58,737) on March 10. During the interview, possible amendments to claim 1 were discussed (these amendments are in this response as new claim 12 rather than amendments to claim 1). In particular, support for the "undegraded" claim element was discussed.

§ 102/103 Rejections

Claims 1-3 are rejected as being anticipated by, or, in the alternative, as obvious over, Buntin (United States Patent No. 3,849,241).

Independent claim 1: 102(b) rejection

In making the 102(b) rejection of claim 1, the Examiner asserts that Buntin anticipates claim 1. Applicant respectfully disagrees. It is a well-known axiom of patent law that in order to anticipate a claim, "the elements must be arranged as required by the claim" (M.P.E.P. 2131). This principle was recently clarified by the CAFC in the Net MoneyIN, Inc. v. Verisign decision (545 F.3d 1359; 88 U.S.P.Q.2D 1751), in which the court declared:

> The "arranged as in the claim" requirement..refers to the need for an anticipatory reference to show all of the limitations of the claims arranged or combined in the way as recited in the claims.

In this decision the court specifically singled out the absence, in an allegedly anticipatory reference, of a link between one claim element disclosed in the reference in the course of a general discussion of one subject, and another claim element disclosed in the discussion of another subject,

as a situation in which the reference fails to show the elements "as arranged in the claim" (see, specifically, the discussion of the Ecolochem Inc. v. Southern California Edison Co. case on pages 16-17 of the Net MoneyIN, Inc. v. Verisign decision).

Applicant submits that this situation is present in Buntin. Buntin's sole mention of PET (col. 4 line 40) is in a "laundry list" in a general discussion of possible polymers in the Description of the Invention. Buntin's teaching of an air temperature that "may vary from 500° to 900°F" (col. 7 line 59), which the Examiner equates with applicant's claim element of a "stream of air having a manifold air temperature of about 260 degrees C or less", is <u>only</u> found in the Description of the Preferred Embodiment, which is <u>entirely</u> concerned with the extrusion of polyolefins. Thus, there is <u>no link</u> between the element of the air temperature, and the element of extruding PET, in the teachings of Buntin.

An additional consideration is that, Buntin teaching air temperatures of 500°F and above, and the applicant claiming air temperatures of less than about 260°C (500° F exactly equaling 260° C), the alleged anticipation only occurs by virtue of the term "about" in applicant's claim element. While such miniscule overlap of ranges might in some circumstances be sufficient to provide anticipation, in the present case there is no link in Buntin between the air temperature range taught and the extrusion of PET, thus claim 1 is not anticipated by Buntin.

<u>Independent claim 1: 103(a) rejection</u>

In making the 103(a) rejection of claim 1, the Examiner asserts that it would have been obvious to one of ordinary skill in the art to apply broadly applicable processing temperatures to the process of Buntin to make a melt blown mat out of polyester (Office Action, page 3).

<u>Results not Predictable</u>

Applicant respectfully submits that the results of operating Buntin's apparatus and process according to broadly applicable processing conditions (e.g., temperatures) would not be predictable. Predictability being required to achieve a prima facie case of obviousness ("the mere fact that references can be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art"; M.P.E.P. 2143.01), the combination of Buntin and broadly applicable processing conditions as known to one of ordinary skill in the art, does not render claim 1 obvious.

As outlined above, Buntin's detailed disclosures of various processing parameters (resin temperature, air temperature, air velocity etc.) are directed overwhelmingly to the extrusion of polyolefins, specifically toward the extrusion of polyolefins in such manner as to achieve degradation to a lower viscosity/molecular weight during extrusion. Buntin speaks in several places of the critical impact of processing conditions on successfully achieving degradation (emphasis added in all citations):

> It is first necessary to, before extruding the resin from the nozzle orifices, to subject the thermoplastic polymer resin to a <u>critically controlled</u> degradation (col. 2 lines 46-48).
>
> This process involves <u>controlling within critical ranges</u> the interrelationships of the parameters of polymer resin flow rate, polymer apparent viscosity, process temperatures, and gas flow rates (col. 2 lines 14-18).

Buntin thus speaks of the need to control the various process parameters within critical ranges, and yet discloses, for thermoplastic polymers in general, only extremely broad or unspecified ranges of such parameters (resin temperature: 550-900^{o}F (col. 3 line 42), air temperature: unspecified). Only for polyolefins does Buntin zero in on specific, narrower ranges.

One of ordinary skill in the art would appreciate that, different polymer resins known to behave quite differently in extrusion/melt-blowing, the results of extruding/melt-blowing non-polyolefin resins at particular process conditions within Buntin's broad ranges would be unpredictable. And, since Buntin himself speaks of the strong effect of process conditions on his controlled degradation process, one would expect, for polymers others other than polyolefins, Buntin's extrusion-degradation/melt-blowing process to be even more unpredictable than extrusion/melt-blowing in general.

Documentary evidence of such unpredictability exists. For example, just to pick one of the above parameters cited by Buntin as needing to be critically controlled, the apparent viscosity of the polymer, the previously submitted Declaration of David Olson (November 3, 2008) provides evidentiary support that the apparent viscosity of PET in applicant's working examples was far higher than the apparent viscosity of polyolefins reported by Buntin. The presence of such sharply differing apparent viscosities of the polymer resin under conditions existing within the extruder, even though applicant and Buntin were using polymer resins of

similar intrinsic viscosity, is prima facie proof of the unpredictability of the effect of process conditions on the extrusion/melt-blowing process when different polymer resins are used.

Furthermore evidentiary support documenting the unpredictability of melt-blowing is found in the art. For example, US Patent 5,753,736 (col. 2 lines 44-53) states:

> The important variables in melt blowing are polymer throughput rate, melt temperature, die temperature, air temperature, air flow rate, screw speed and die-to-collector distance. Melt blowing is a complex process that involves turbulence which is poorly understood by the scientists until today. Isolation of experimental factors is difficult because of interaction between different variables. The multifilament environment, and the environmental factors such as the humidity of the processing room, quench air temperature widely change the boundary conditions.

Thus in summary, given the knowledge of those in the art of the unpredictability of the extrusion/melt-blowing process in general, and given Buntin's discussion of the critical effect of melt-blowing process parameters on the achieving of his desired controlled degradation, the result of extrusion/melt-blowing PET within the very narrow subset of Buntin's broadly disclosed processing conditions that correspond to applicant's claim 1, would be entirely unpredictable to one of ordinary skill in the art. Predictability being required for obviousness to be present, Buntin does not present a prima facie case of obviousness of claim 1.

<u>No Reasonable Expectation of Success</u>

In addition to the aforementioned lack of predictability, there is also no reasonable expectation of success that operating Buntin's process within the specific process conditions corresponding to claim 1 to produce PET would provide the "critically controlled degradation" desired by Buntin. As stated above, Buntin speaks of the critical effect of processing parameters on the achieving of his desired degradation, and yet Buntin does not provide anything beyond the aforementioned extremely broad process ranges, other than for polyolefins. One of ordinary skill in the art, aware of the very different behavior of different polymer resins in extrusion/melt-blowing, and knowing of the different effect that various process parameters would have on such different resins, would have no expectation that extruding/melt-blowing PET resins within the conditions corresponding to applicant's claim 1, would succeed in achieving the desired critically controlled degradation.

A reasonable expectation of success being required to achieve a prima facie case of obviousness ("Reasonable Expectation of Success Is Required"; M.P.E.P. 2143.02), the combination of Buntin's teachings and broadly applicable processing conditions as known to one of ordinary skill in the art does not render claim 1 obvious.

For at least the aforementioned reasons, applicant respectfully submits that a prima facie case of obviousness of claim 1 is not achieved by Buntin. Thus, applicant requests that the 103(a) rejection be withdrawn.

Dependent Claims 2-4 and 11

Applicant submits that dependent claims 2-4 and 11 each depend ultimately on patentable independent claim 1 and should be allowed for at least this reason.

With specific regard to claim 3, the above arguments with regard to the 102/103 rejection of claim 1 are applicable to claim 3. Additionally, it is recognized that one way to rebut an obviousness rejection is to show that a particular claimed range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. (M.P.E.P. 2144.05 III, quoting *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)).

Applicant's claimed range of process conditions are taught by applicant to achieve a unique morphology of the melt-blown PET fibers (page 4, line 8). This morphology involves at least in part a retained orientation (page 9 lines 7-9) that results in the fiber being oriented (as specifically stated by applicant, e.g., on page 14 lines 10, 25 and 32). The feature of the fibers being oriented is explicitly included in claim 3.

Buntin, in contrast, does not teach that any such orientation is achieved/retained under any of his process conditions. In fact, with regard to fibers produced under his low air flow rate conditions he explicitly states that the morphology of these fibers is non-oriented (col. 10, lines 28-29). With regard to fibers produced under higher air flow rates (more rapid cooling), he states that the high air flow fibers exhibit higher flexibility and higher elongation to break (col. 10 lines 32-33). One of ordinary skill in the art would not associate such properties as increased flexibility and extendability with the onset or development of orientation. Thus, Buntin does not teach oriented fibers and in fact teaches the opposite.

This being the case, applicant's achieving of a unique, oriented fiber morphology, undiscovered and unappreciated by Buntin, is clear evidence of the criticality of applicant's

claimed process conditions over the broad ranges taught by Buntin. An oriented fiber being specifically present as an element in claim 3, and Buntin only teaching “non-oriented fibers” as explained above, claim 3 is neither anticipated nor rendered obvious by Buntin.

With regard to new dependent claim 11 (depending on claim 1), applicant submits that this claim is not anticipated by Buntin. In the response of November 3, 2008, applicant had argued that Buntin did not meet the “sufficient specificity” test of M.P.E.P. 2131.03 (Response, page 7, Section II-A-3). In the Office Action of December 29, 2008 the Examiner rejected this argument based on the fact that applicants ranges were “unlimited” below about 260 °C, about 270 °C, about 285 °C, and about 295 °C (with respect to the various resin and air temperatures claimed in claims 1, 5 and 6). New dependent claim 11 has the feature that the molten PET polymer is extruded at a temperature of from about 295 degrees C to about 260 degrees C. With this lower limit on the temperature of the molten polymer, applicant’s claimed temperature range is about 35 degrees C wide. Applicant respectfully submits that this range is sufficiently narrow in comparison to the extrusion temperature range taught by Buntin of 194 degrees C in width (288 °C to 482 °C) to meet the “sufficient specificity” condition of M.P.E.P. 2131.03.

Applicant notes that, with regard to the range of extrusion temperatures taught by Buntin, the Examiner asserts that Buntin actually teaches a lower range starting at 280 °C, rather than the 288 °C cited above. This is based on the Examiner’s assertion (Office Action, page 19, top) that Buntin teaches extruding PET at temperatures “well above PET’s melting point” (known to be 250-260 °C). The statement of Buntin relied on by the Examiner is as follows (col. 3 lines 34-37):

> There are a few general approaches to bring about the extent of polymer degradation requisite to the practice of this invention. Temperatures well above the melting point of the polymer are employed.

Applicant respectfully submits that one of ordinary skill in the art would recognize this as a general guideline that does not define what is meant by “well above” and does not support the Examiner’s *a priori* conclusion (Office Action, page 2) that “well above” would “<u>necessarily</u>” include temperatures as low as 280°C (i.e., as low as 20-30 degrees C above PET’s melting point). The *a priori* selection of a specific number based on such an ambiguous, unquantifiable adjective as “well above” may not be properly employed if the reference contains specific

teachings that clarify and define what is meant by "well above". In this case, Buntin provides, just a few sentences after the above-cited statement, an explanation of the specific temperature ranges that meet his criteria of "well above" the melting point of the polymers employed (col. 3 lines 39-43):

> the high intrinsic viscosity resin suitably is subjected to a temperature within the range from about 550°F. to about 900°F., preferably from about 600 °F. to about 750°F.

Contrary to the Examiner's assertion (Office Action, page 2), in the above-cited passages Buntin does not teach that the minimum temperature could be within the above-cited numerical ranges "<u>or</u>" well above the melting point. Rather, it would be clear to one of ordinary skill in the art that these numerical ranges clarify and define the minimum temperatures deemed usable by Buntin, above and beyond the general guideline of using temperatures "well above" the polymer melting point. That is, one of ordinary skill in the art would appreciate that Buntin's explicit teaching of a minimum temperature of 550°F defines, within the broad guidance of temperatures "well above" the melting point of a polymer, the minimum extrusion temperature actually disclosed by Buntin. Thus there is no support for the Examiner's assertion that the minimum extrusion temperature taught by Buntin is 280°C. Rather, 288°C (550°F) is the minimum temperature taught by Buntin. Thus, applicant's above argument with regard to lack of sufficient specificity in Buntin appears to be well founded. Applicant thus respectfully submits that claim 11 is not anticipated by Buntin, for at least this reason.

With further regard to new dependent claim 11, applicant submits that this claim is not rendered obvious by Buntin, since the same arguments as presented above with regard to claim 1 (unpredictability of results, lack of expectation of success, criticality of ranges, etc.) apply to claim 3. With regard to the specific process conditions claimed by applicant, Buntin's teaching of resin temperatures of at least about 288 °C, and applicant's claiming of resin temperatures of less than about 295°C , means that there is only minimal overlap between the two ranges. Likewise, Buntin's teaching of air temperatures of 260°C and above, and applicant's claiming of air temperatures of less than about 260°C, means that the only overlap between these ranges occurs at "about" 260°C. Thus, applicant's claimed ranges do not lie wholly within the broad ranges disclosed by Buntin and in fact only fleetingly overlap Buntin's ranges at the endpoints. This, in combination

with the above argument regarding the unique and unexpected oriented fiber morphology resulting from applicant's claimed process conditions, would lead one of ordinary skill in the art to readily appreciate the criticality of applicant's claimed ranges.

<u>Independent Claim 5</u>

Independent Claim is rejected under 35 U.S.C. 103(a) as being unpatentable over Buntin as evidenced by Mark in view of Thompson.

Applicant respectfully submits that the arguments presented above in response to the 103(a) rejection of claim 1 are also applicable to claim 5. Specifically, the results of extrusion/melt-blowing PET within the very narrow subset of Buntin's broadly disclosed processing conditions that correspond to applicant's claim 5, would be entirely unpredictable to one of ordinary skill in the art. Predictability being required for obviousness to be present, Buntin does not present a prima facie case of obviousness of claim 5 for at least this reason.

Additionally, given Buntin's emphasis of the criticality of process conditions on achieving his desired controlled degradation, and given the fact that Buntin does not teach specific process conditions for achieving such degradation for polymers other than polyolefins, one would have no expectation of success that extrusion/melt-blowing PET at the particular process conditions corresponding to applicant's claim 5, would result in the desired controlled degradation. Expectation of success being required for obviousness to be present, Buntin does not present a prima facie case of obviousness of claim 5 for at least this reason. (The Thompson reference is used by the Examiner to supply the annealing/bonding claim element, and Mark is used to supply the melting point of PET; they do not correct the above deficiencies in the primary reference).

Additionally, since claim 5 explicitly includes the claim element that the PET fibers are oriented, the argument made on pages 10-11 of this response with regard to claim 3 also applies to claim 5. That is, the achieving of a unique, oriented fiber morphology, undiscovered and unappreciated by Buntin, is clear evidence of the criticality of applicant's claimed process conditions over the broad ranges taught by Buntin. Thus, the oriented fiber feature of claim 5 both provides a claim element that is not taught by Buntin nor supplied by any secondary reference, and also serves to confirm the criticality of applicant's process conditions that are present as elements in claim 5.

Thus in summary, claim 5 is neither anticipated nor rendered obvious by Buntin.

Dependent Claims 6-10

Applicant submits that dependent claims 6-10 each depend ultimately on patentable independent claim 1 and should be allowed for at least this reason.

With specific regard to claim 6, this claim has the feature of the temperature of the PET polymer being about 275 ^{o}C or less when extruded. In rejecting this claim, the Examiner admits that Buntin does not explicitly teach such a range (Office Action, page 6, bottom), but rather asserts that Buntin recognizes the extruder temperature as a result-effective variable. Accordingly, the Examiner asserts that it would have been obvious for one of skill in the art to determine a desired extruder temperature via routine experimentation.

However, the above arguments have demonstrated that the effect of varying process parameters in extrusion/melt-blowing processes in general, and in Buntin's extrusion-degradation/melt-blowing process in particular, is unpredictable. This is particularly true, again as mentioned above, in the case of PET, since Buntin provides no detailed guidance for polymers other than polyolefins. Therefore, it would not be a matter of routine optimization for one to arrive at the particular subset of process conditions claimed in claim 5. Alternatively phrased, one of skill in the art would have no expectation of success that the particular process conditions of claim 6 would achieve the controlled degradation sought by Buntin. Applicant submits that dependent claim 6 is not rendered obvious by the cited references for at least this reason.

New Independent Claim 12

New independent claim 12 contains, among other features, the feature of feeding undegraded PET polymer of an intrinsic viscosity of between about 0.45 and 0.75 into an extruder that is connected to a meltblowing die, such that the PET polymer becomes molten, and the feature of extruding the molten undegraded PET polymer at a temperature of about 295 degrees C or less through the orifices of the meltblowing die into a high-velocity stream of air.

Applicant submits that Buntin, being completely concerned with the extrusion of resins in such manner as to degrade the resin, does not disclose or suggest this combination of claim elements. In one embodiment, Buntin teaches the degradation of a resin within an extruder that is connected to a melt-blowing die (col. 4 lines 23-25). In such case, Buntin clearly does not teach

extruding undegraded PET through the orifices of a melt-blowing die. In another embodiment, Buntin teaches the pre-degradation of a resin in an extruder separate from the melt-blowing apparatus (col. 4 lines 22-23). In such case, Buntin clearly does not teach extruding undegraded PET through the orifices of a melt-blowing die and also does not teach feeding undegraded resin into an extruder that is connected to a melt-blowing die. Thus, Buntin clearly does not anticipate claim 12.

Applicant also respectfully submits that Buntin does not render claim 12 obvious. Buntin teaches degradation to be “required” (col. 2 line 30). Buntin thus teaching directly away from the use of undegraded resins in the strongest possible terms, one of ordinary skill would not be led, based on the teachings of Buntin, to extrude undegraded polymer resins.

Conclusion

Applicant appreciates the courtesy of the Examiner’s detailed consideration of the various claims pending in the present case. Applicant believes that applicant has in turn responded to the grounds of rejection applied to each independent and dependent claim.

In view of the above remarks, it is submitted that the pending claims are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections, and allowance of claims 1-12, is respectfully requested.

Respectfully submitted,

3/25/2009 /Kenneth B. Wood/

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